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① Use of E1 prostaglandin to cure male erectile impotence.

② Use of E1 Prostaglandin (Alprostadi) in the preparation of pharmaceutical compositions for the treatment of male erectile impotence, carried out by introducing therapeutically active quantities of the medication into the corpora cavernosa of the penis.



The present invention refers to the use of E1 Prostaglandin (Alprostadi) to prepare pharmaceutical compositions to be used in the cure of male erectile impotence, a treatment administered by the introduction of a solution containing a quantity of Alprostadi between 10 and 50 µg in the corpora cavernosa.

Until a few years ago, it was widely held that male impotence, especially insofar as erectile deficiency was concerned, could be put down to psychogenic causes.

All the best known authors in the field, Kinsey, Masters and Johnson and later Helen Singer Kaplan, were of the opinion that psycho-physiological states were predominantly to blame for male sexual dysfunctions. It is held that depression, stress and fatigue could have a serious effect on sexuality and male erections in particular although the exact mechanism through which emotional states negatively influence sexuality can not be clearly identified.

However, it has been found that many illnesses, even in their initial stages, can depress the libido, and that hepatopathic or renal diseases, as well as multiple sclerosis and diabetes, negatively influence the erectile function of the male member. Recent studies have established that the incidence of organic causes on male erectile impotence is certainly not less than 80% and that, amongst these causes, the vascular ones are prevalent. In particular, it was possible to establish using modern vascular diagnosis techniques, which do not require samples or surgery (Doppler method), that primitive alterations of the penis area and alterations of the venous drainage are amongst the prevailing causes.

Aside from those cases when a cavernography shows alterations of the deep dorsal vein, which can be cured by a simple ligature under surgery, it should be remembered that in some instances erection deficiency has been treated by papaverin infusion in the patient's corpora cavernosa. It is common knowledge, however, that this treatment may be highly dangerous as there are frequent cases where drugs have had to be administered to patients to counteract prolonged erection. Moreover, it has also been found that the continued use of papaverin can have irreparable delayed consequences (fibrosis of the corpora cavernosa), as well as so called immediate reactions such as priapism. Therefore, this practice has been almost completely abandoned.

Our invention proposes to use E1 Prostaglandin (Alprostadi) to prepare pharmaceutical compounds to be injected in quantities of between 10 and 50 µg of the active ingredient in the corpora cavernosa. The results are identical to those obtained using papaverin without any of the immediate or delayed harmful side-effects.

Only a slight swelling is reported in the area where the injection has been made. Alprostadi (Alprostadium) is a well known substance usually defined as Alfa blocking:

11,15- Dihydroxy-9-oxoproxt-13-en-1-oic acid; 3-hydroxy-2-(3-hydroxy-1-octenyl) -5-oxocyclopentaneheptanoic acid;  $C_{20}H_{34}O_5$  molecular weight 354.49

So far, it has only been used in the following instances: palliative therapy to keep the arterial duct temporarily open until adequate surgery can be carried out (so-called 'blue-disease') (J.S. Donahoo et al., J. Thoracic Cardiovasc. Surg. 81, 227 (1981); other circulatory disorders like atresia and stenosis of the pulmonary valve, atresia of the tricuspid valve, stenosis and atresia of the aorta valve, and, lastly, in the cure of chronic obstruction of arteries at the third and fourth level.

Our invention proposes a totally new use for Alprostadi and more precisely its use in the preparation of pharmaceutical compositions to cure erectile deficiency. The above mentioned compositions are obtained by dissolving 10 to 50 µg of Alprostadi every 1 to 5 mg of physiological saline solution or low alcoholic solution. Each dose contains 10 to 50 µg of Alprostadi.

The therapeutic treatment is carried out by local injection of said compositions in the corpora cavernosa using insulin needles or, better still, micro needles of reduced diameter. Alternatively, said compositions can be introduced using the well known iontophoresis technique.

Observations carried out on a suitable number of patients have shown that, after a period not longer than fifteen minutes, the penis becomes rigid for a period of time between 30 minutes and 4 hours approximately, depending on the quantity of medication injected and the state of the corpora cavernosa, so as to allow one or more satisfactory acts of sexual intercourse.

Moreover, this method has been found to have no harmful side effects, while having very interesting therapeutic properties, even in the long term, as the corpora cavernosa acquire more elasticity a little at a time, by continually absorbing the medication.

As previously mentioned, Alprostadi is as effective as papaverin in the cure of male erectile deficiencies, while being absolutely free from both immediate and delayed harmful consequences. Alprostadi, moreover, unlike papaverin, determines more elasticity in the corpora cavernosa in the long term, with obvious advantages.

Obviously, many changes and variations to the proposed above described therapeutic schedule are possible, whilst remaining within the concept and scope of the invention.



**Claims**

1. Use of Prostaglandin E1 (Alprostadil) in the preparation of pharmaceutical compositions for the treatment of male erectile impotence. 5
2. Use as per claim 1, characterized by the fact that said compositions consist of physiological saline solutions in doses containing 10 to 50  $\mu$ g of Alprostadil. 10
3. Use as per claim 1, characterized by the fact that said compositions consist of low alcohol content alcohol solutions, in doses containing 10 to 50  $\mu$ g of Alprostadil. 15
4. Use as per claim 1, characterized by the fact that said compositions consist of 10 to 50  $\mu$ g of Alprostadil and 1 to 5 ml of physiological saline solution. 20
5. Use as per claim 1, characterized by the fact that said compositions consist of 10 to 50  $\mu$ g of Alprostadil and 1 to 5 ml of low alcohol content alcohol solution. 25
6. Use as per claim 1, characterized by the fact that said compositions are introduced in the corpora cavernosa by injection. 30
7. Use as per claim 1, characterized by the fact that said compositions are introduced in the corpora cavernosa by iontophoresis. 35
8. Method for the treatment of male erectile impotence, in which compositions consisting of E1 Prostaglandin (Alprostadil) and physiological saline solution or low alcohol content alcohol solution are introduced in the corpora cavernosa by injection or iontophoresis. 40

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